

CHAPTER 1

GENERAL

1-1. Purpose and scope. This manual prescribes the standards, methods and guidance to be used by personnel responsible for the design and construction of water distribution systems at Army mobilization installations.

1-2. Definitions. Definitions will be as defined in EM 1110-3-160.

1-3. System planning. The distribution system must provide water in sufficient quantities at adequate pressures for all intended purposes. In order to plan or design a water distribution system, the location or point of demand must be known or assumed, and the magnitude of each demand known or estimated; water demands may then be categorized by purpose as domestic, industrial, special, or fire protection. Criteria for determining water demands are presented in EM 1110-3-160. Criteria for water sources are presented in EM 1110-3-161. Criteria for sizing and locating water treatment plants are presented in EM 1110-3-162. Criteria for determining water storage facilities are presented in EM 1110-3-163. Sizing of the water treatment plant, water storage facilities, distribution pumps, or distribution mains is dependent on the size of the other parts of the system. It is not practical to size individual distribution mains without considering the other elements of the system. The effectiveness of any proposed combination of storage, pumping, and distribution works in meeting projected peak demands is best determined by hydraulic analyses of the system.

1-4. Cross connections.

a. Avoidance of cross connections. If fires are to be fought with both potable and nonpotable supplies, separate distribution systems should be used to deliver the two types of water to the required area. Hydrants or other connections for each system should be suitably identified to discourage improper use. Standby water reservoirs serving fire protection systems are sometimes filled from both potable and nonpotable supplies. If this is the case, the potable water should be discharged to the reservoir through an air break not less than 12 inches above the maximum water level of the reservoir. In a similar manner, where potable water is to be used as a gland seal on a pump handling nonpotable water, the gland seal water must be stored in a tank with an air gap between the end of the potable water supply line and the maximum water level possible in the tank. Special care must also be taken of such items as valve pits and water storage facilities to insure that surface water runoff cannot enter potable water systems. Other situations that can result in back-siphonage are flexible hose having one end immersed in nonpotable water and the other end connected to a potable water hose bib, potable water lines entering swimming

pools without air gaps, lawn irrigation systems with sprinkler heads flush with the ground, and improper connections at vehicle wash racks.

b. Prevention of backflow. Devices for the prevention of backflow include air gaps, check valves, and reduced-pressure backflow preventers. Air gap distances should be at least twice the diameter of the water supply line. Check and double check valves for backflow prevention are not considered suitable and will not be used. Back-siphonage can be prevented with air gaps, atmospheric-type vacuum breakers, or pressure-type vacuum breakers.